

Application No.: 10/593,771

Docket No.: 1422-0724PUS1

Amendment to the drawings:

Replace current drawing sheet 9/10 with replacement drawing sheet 9/10 enclosed herewith.

REMARKS

This is in response to the Office Action of April 9, 2010. A typographical error is corrected in the drawings. The features of dependent claim 2, 3, 8, 9, and 16 have been incorporated into their respective independent claims (i.e., claims 1, 7, and 14). Claims 2, 3, 8, 9, and 16 are accordingly cancelled, without prejudice. New claims 20 and 21 are added, based upon such disclosure as that in paragraph [0032] of the specification – see also original claim 15. No new matter has been introduced into the application by this Amendment. Claims 1, 4-7, 10-15, and 17-21 are now pending in this application.

Drawings

Figure 11 is amended to correct a typographical error. Specifically, the reference number “20” has been corrected to “202.”

35 U.S.C. § 112

Claims 3, 9, and 16 were rejected under the second paragraph of 35 U.S.C. § 112 as failing to define the invention properly. Office Action, page 2. The features of claims 3, 9, and 16 are now recited in claims 1, 7, and 16, respectively. It is respectfully submitted that the claims in their present form particularly point out and distinctly claim subject matter considered by Applicants to constitute their invention. Accordingly, withdrawal of this ground of rejection is in order and is earnestly solicited.

35 U.S.C. § 102 - Gianchandani

Claims 1, 2, 7, 8, 14, 15, and 19 were rejected under 35 U.S.C. § 102(b) as being anticipated by US 6,686,998 B2 (Gianchandani). Office Action, page 3. Independent claim 1 now recites the feature of admittedly non-anticipated claim 3, while independent claim 7 now

recites the feature of admittedly non-anticipated claim 9 and independent claim 14 now recites the feature of admittedly non-anticipated claim 16. Thus, the claims in their present form all avoid anticipation by Gianchandani. Withdrawal of this ground of rejection is in order and is earnestly solicited.

35 U.S.C. § 102 - Platzer

Claims 14, 15, and 17-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by US 6,381,014B1 (Platzer). Office Action, pages 3-4. Independent claim 14 now recites the feature of admittedly non-anticipated claim 16. Thus, claims 14, 15, and 17-19 in their present form avoid anticipation by the Platzer reference. Withdrawal of this ground of rejection is in order and is earnestly solicited.

35 U.S.C. § 103

Claims 1-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over US 7,018,830 B2 (Wilding) in view of US 4,302,313 (Columbus) or US 6,734,964 B1 (Duan). Office Action, pages 4-5. The rejection is respectfully traversed.

The Wilding apparatus does not contain an electrode. Therefore, the present invention – which involves applying an electric field – differs significantly from the technology disclosed in Wilding.

The sample to be treated in the Duan apparatus is an organic vapor, not a liquid as in the present invention.

In the device of Columbus, there is no narrow portion in a flow channel formed between the electrodes. That is, the cross-section of the flow channel between the electrodes is unchanged.

Moreover, in any case, none of the cited references discloses or suggests a process for generating plasma by vaporizing liquid. Therefore, the dimensions which Applicants have discovered for a flow channel to be used for such purpose – which dimensions are now recited in

all of the claims herein – are not necessary to distinguish over the prior art. Accordingly, the Examiner’s mention of “routine experimentation” is irrelevant to the present situation, in which the combined prior art is silent with respect to a fundamental feature of Applicants’ invention.

The apparatus of the present invention is provided with a narrow portion in a flow channel between electrodes. In the present invention, plasma can be generated by filling the flow channel and the narrow portion with a conductive liquid, and thereafter applying an electric field to the narrow portion to conduct the electric field through the narrow portion, thereby forming bubbles.

In the embodiments of Applicants’ invention that relate to elemental analysis by spectroscopy (see claims 7, 10-13, and 19), the analysis is carried out by subjecting light from the generated plasma to spectroscopy. For the emission spectroscopic analysis, it is necessary to generate plasma having a high temperature. With regard to high temperature plasma generation, it is well known to persons of ordinary skill in the relevant art that, upon contacting a high temperature plasma with a wall of a container, (a) very often the container will be broken immediately due to thermal shock, or (b) if the wall does not break, material of the wall will contaminate the plasma, and/or (c) the temperature will be drastically lowered so that properties of the plasma are remarkably deteriorated.

For the foregoing reasons, devices using a simple, straight capillary as a container – as suggested by the Columbus reference – cannot be employed in the method of the present invention.

CLAIMS 15, 20, AND 21 SEPARATELY PATENTABLE: Dependent claims 15, 20, and 21 herein are patentable for all of the reasons that apply to claims 1, 4-7, 10-14, and 17-19, and also because these claims expressly require “a pair of electrodes arranged in the flow channel in a manner that the narrow portion is sandwiched therewith.” Nothing in Wilder, Columbus, or Duan is suggestive of the presence of a pair of electrodes as recited in claims 15, 20, and 21.

Withdrawal of the obviousness rejection of claims 1, 4-7, 10-14, and 17-19 – and in particular of claims 15, 20, and 21 – is in order and is earnestly solicited.

Contact information

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Richard Gallagher, Registration No. 28,781, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By 
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